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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/857,803	06/11/2001	Hiroji Aga	109725	2312
25944	7590	01/16/2004		
OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320			EXAMINER ESTRADA, MICHELLE	
			ART UNIT 2823	PAPER NUMBER

DATE MAILED: 01/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/857,803	<b>Applicant(s)</b> AGA ET AL.	
	<b>Examiner</b> Michelle Estrada	<b>Art Unit</b> 2823	<i>uw</i>

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 November 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) 6-9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \* c) ☐ None of:  
         1. ☐ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
     \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
     a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                             | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### **Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Yamamoto (JP-10275905) and Sato (US 2002/0127820).

Yamamoto discloses a method for producing an SOI wafer by the hydrogen ion delamination method comprising at least a step of bonding a base wafer (5) and a bond wafer (1) having a micro bubble layer formed by gas ion implantation (See fig. 1c) and a step of delaminating a wafer having an SOI layer (2) at the micro bubble layer as a border, wherein, after the delamination step, the wafer having an SOI layer is subjected to a hydrogen RTA treatment.

Yamamoto does not disclose cooling the wafer, and a heat treatment of a batch furnace.

Sato discloses a semiconductor substrate (10); forming an insulating layer (14); implanting hydrogen ions into the semiconductor surface; semiconductor substrate (10) is joined to a support substrate (13); the resulting structure is subject to thermal treatment for delamination (Page 17, Paragraph [0271]; and after delamination the laminate is set in a hydrogen annealing furnace and subjected to heat treatment (Page 17, Paragraph [0273]. The combination teaches annealing by either furnace or RTA. It

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would have been within the scope of one of ordinary skill in the art to use either one (furnace or RTA) for the first part of the heating step and the other one for the rest of the heating step. A cooling step would occur after RTA treatment upon removal of the light source.

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Yamamoto and Sato to enable formation of part of the heat treatment of Yamamoto. Also, It would have been within the scope of one of ordinary skill in the art to use hydrogen in the heating step of Sato because it would be use to eliminate the roughness in the surface of the wafer after the delamination step as described by Yamamoto.

Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Yamamoto and Sato as applied to claims 1 and 2 above, and further in view of Adachi et al. (6,074,479) and Wolf et al. (Vol. 1).

The combination of Yamamoto and Sato does not disclose that the wafer is a CZ wafer of which COPs (Crystal Originated Particles) at least on surface are reduced is used as the bond wafer, and that the CZ wafer is produced from a single crystal ingot.

Adachi et al. discloses a wafer, which is a CZ wafer of which COPs (Crystal Originated Particles) at least on surface are reduced (Col. 1, lines 25-30). It would have been within the scope of one of ordinary skill in the art to employ the CZ wafer of Adachi et al. to provide the bond wafer of the combination and further enhance quality of the product.

Wolf et al. (Vol. 1) discloses that the CZ wafer can be produced from a single crystal ingot (See pages 23-25).

It would have been within the scope of one of ordinary skill in the art to produce the CZ wafer of Wolf (Vol. 1) to enable the bond wafer of the combination of Yamamoto, Sato and Adachi et al. to be provided.

### ***Response to Arguments***

Applicant argues that Yamamoto does not teach utilizing both a rapid heating/rapid cooling apparatus and a batch processing type furnace to improve both short periods and long periods of the SOI layer. However, Yamamoto does not need to disclose the same advantages as the instant invention, it is only necessary that the same materials are treated in the same manner.

Applicant argues that Sato method does not produce an SOI wafer by the hydrogen ion delamination method as described in claim 1. However, Sato was not relied on upon for that purpose.

Applicant argues that there is no motivation to utilize both a rapid heating/rapid cooling apparatus and a batch type furnace in a single process in either of the cited references. However, motivation has been provided in the office action mailed 7/15/03.

Applicant argues that there is no motivation in either Sato or Yamamoto to combine only a heat treatment for a wafer after forming an SOI wafer by the method of Sato with the heat treatment of Yamamoto, or vice versa, to produce an SOI wafer since

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the methods are completely different. However, the additional teachings do not negate those relied on.

Applicant argues that neither Yamamoto nor Sato contain motivation to combine RTA and batch processing type furnace. However, it is not necessary for the references to disclose the motivation. Reasoning for combining the teachings is sufficient.

Applicant argues that none of the cited references disclose that when an SOI wafer is produced by the hydrogen ion delamination method, a wafer having reduced COPs is used as the bond wafer (Argument in page 9, 2<sup>nd</sup> paragraph). However, applicant has merely recognized advantages of the process made obvious by the combination of Yamamoto, Sato, Adachi et al. and Wolf et al.

Applicant argues that none of the references teach the existence of a problem that the buried oxide layer is etched through COPs in the SOI layer when the SOI wafer after the delamination is subjected to heat treatment in the atmosphere containing hydrogen or argon. However, it is not necessary for the reference to disclose that the process of the reference is performed to achieve the same goals as applicant or to obtain the same advantages recognized by applicant. It is sufficient that the process suggested by the reference alone or in combination with the remaining references is encompassed by the instant claims.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Estrada whose telephone number is (703) 308-0729. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



George Fourson  
Primary Examiner  
Art Unit 2823



MEstrada  
January 12, 2004